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January 28, 1841.

The MARQUIS OF NORTHAMPTON, President, in the Chair.

The reading of a paper entitled, "On the action of certain Inorganic Compounds when introduced directly into the Blood." By James Blake, Esq., M.R.C.S. Communicated by P. M. Roget, M.D., Sec. R.S., was resumed and concluded.

The present paper is a continuation of a memoir read at the Académie des Sciences of Paris, in 1839, and entitled, "Effets de diverses substances salines, injectées dans le système circulatoire *."

After some preliminary remarks on the mode in which the experiments were conducted, and on the assistance derived from the *hæmadynamometer* of Poiseuille (or instrument for measuring the pressure of the blood circulating in the vessels), the author gives a list of the various saline substances of which he noted the effects when they were severally injected either into the venous or the arterial systems, arranged according to the nature of those effects. He finds, in general, that all the salts having the same base exert similar actions when introduced directly into the blood. He carefully inquires into the phenomena apparently arising from the direct contact of each of the substances above enumerated with the animal tissues; and more particularly into the effects produced on the heart, on the muscular and the nervous tissues, and on the pulmonary and systemic capillaries.

The first series of experiments related are those on the action of the salts of magnesia: these are found, when introduced in any quantities into the blood, to arrest altogether the action of the heart; but a still more remarkable effect which results, is the complete prostration of muscular power. The salts of zinc have a similar operation under the same circumstances, but produce the same effects in smaller quantities. The action of the salts of copper, of lime, of strontia, of baryta, and of lead, are considered successively in the order in which they are more closely related by their physiological actions. The author particularly notices the peculiar action which the salts of the three last-named substances exercise on the muscular tissues, occasioning contractions in them during many minutes after death produced by their introduction into the blood. These muscular movements were, in some cases, observed forty-five minutes after the cessation of the heart's action. Experiments with the salts of silver and of soda are then detailed; substances, which exhibit a remarkable similarity in their actions on the pulmonary tissue, on the heart, and on the systemic capillaries: for while, in the case of all the other salts already mentioned, death seems to be produced by the destruction of the irritability of the heart, the fatal result with the salts of silver and of soda is the consequence of their action on the tissue of the lungs. The physiological actions of the salts of

* Published in the "Archives Générales de Médecine; Nov. 1839."

ammonia and of potass were found by the author not to correspond with any of the preceding. Although agreeing perfectly with one another in their action upon the heart and systemic capillaries, they differ extremely in their effects on the nervous tissue; ammonia being particularly distinguished from all inorganic compounds in this respect, and being very analogous to poisons derived from organic products, which it also resembles in its chemical properties.

The general conclusion which the author is led to draw from these researches is, that there exists a close relation between the chemical properties of the substances experimented upon, and their physiological effects; his experiments tending to prove, that, when introduced into the blood, substances which are isomorphous exert similar actions on the living tissues. He notices, however, two exceptions to this law; namely, the similarity of the actions exerted on the pulmonary tissue by the salts of lead with those of silver, although these salts are not isomorphous; and also the action on the nervous tissue of the salts of ammonia being different from that of the salts of potass. But he remarks that the oxide of lead bears a close analogy to the oxide of silver in its relation to organic compounds. The general fact previously announced by the author in his memoir read to the Academy of Sciences at Paris, namely, that salts with the same base have analogous actions, may be considered as a corollary of the above law.

February 4, 1841.

Sir JOHN W. LUBBOCK, Bart., V.P. and Treas., in the Chair.

David Francis Atcherley, Esq., was balloted for and duly elected into the Society.

A paper was read, entitled, "On some Electro-Nitrogurets." By Wm. Robert Grove, Esq., M.A., F.R.S.

The author states that he has made many attempts to render permanent the ammoniacal amalgam, and that he has succeeded in freezing it by means of solid carbonic acid, during which solidification, and also while in its solid state, it underwent no chemical change. He subsequently attempted to procure a permanent compound by electrolyzing a solution of hydrochlorate of ammonia with an extremely fusible alloy at the cathode; but this attempt was unsuccessful. It then occurred to him, that by using an oxidable metal at the anode, which could be revived in conjunction with nascent hydrogen and nitrogen at the cathode, one or both of these elements might be combined with the solid metal, and so form permanent compounds.

The experiment made in this manner with the metals zinc, cadmium, and copper, was perfectly successful. A spongy mass col-